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Cnicus edulus Nutt. (?). A single plant collected near Veta Pass; whilst agreeing tolerably well with the description of this species, the specimen is not in a condition to be satisfactorily determined. T. Meehan, who collected it, says he has not seen this plant from Colorado before.

Troximon glaucum. On the roadside between Bellevue mountain and Central City; quite scarce.

Phacelia glandulosa Nutt. Southern Colorado.

Physalis hederæfolia Gray (?). On the plains before reaching Denver; plant prostrate and very viscid, leaves small and short petioled.

Mimulus floribundus Dougl. The specimens collected at Boulder Falls have all the pedicels shorter than the leaves.

Herpestis rotundifolia Pursh. Collected at Cahokia, Illinois; with the leaves having punctate dots.

Salix flavescens Nutt. (?) On the trail to Pike's Peak through Engelmann's Cañon. M. S. Bebb says: "It has been frequently collected and is most likely allied to *S. flavescens* Nutt. of the Pacific coast, somewhat as *S. Fendleriana* is allied to *S. lasiandra*, that is, it may prove a hybrid between that and *S. discolor*."

Populus monilifera Aiton. On the low lands near Pueblo.

Abies concolor Lindley and *Juniperus occidentalis* Hook. In Engelmann's Cañon and Queens Cañon.

Smilax herbacea Linn. Plant more robust than the eastern form, leaves larger, more rounded; one specimen, only, collected in Glen Eyrie, with no evidence of the odor that usually accompanies the plant.

Lycurus phleoides H. & B. Collected in the Garden of the Gods, probably introduced from Mexico by traveling teamsters.

Muhlenbergia glomerata Trin. A form of this species near Manitou, not common.

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MOLD AS AN INSECT DESTROYER.

BY C. G. SIEWERS.

THE perplexing problem: How shall we check the excessive increase of noxious insects that imperil our crops? has been put in a fair way of solution by the researches of Dr. Bain, a Prussian savant, as recorded by Dr. Hagen, of Cambridge, Mass., in the June number of the *Canadian Entomologist*.

When Pasteur, employed by the French government to investigate the fatal malady that had attacked the silk-worm, made the discovery that the disease was caused by a fungus growth which he styled muscardine, that it could be imparted to healthy larvæ simply by crushing infected ones on their food, and that the disease could be detected, by means of a lens, in the egg itself, and thus the good eggs separated from the bad, he saved from utter ruin thousands of French families whose main support depended on this industry. But he did more. Though he carried his researches no farther, others took up the investigation where he abandoned it, and the result of Dr. Bain's experiments, continued for twelve years, seem to have established the following facts:

That the mold of the mash tub, known as yeast, the mold that infects flies and fastens them to our walls and windows, the common mold of cellars and damp places, and the mold that attacks certain water plants are but different developments of allied species of fungi, and alike fatal to certain species of insects that are brought into contact with it; and that the disease was developed in France by moist food, lack of ventilation and cleanliness, is probable, and though many were able to pass through all stages, their infected eggs spread the disease through the land, and in this way became epidemic.

I have just had an unpleasant experience of the effect of mold in the loss of a full-grown imperial walnut larva that I had reared from its first molt. Its food was inserted in wet sand in a covered tub, and before I was aware, its droppings and food were covered with mold. Fresh food, a sun bath and change of quarters was of no avail; it refused food for four days, then dropped from its perch a moist discolored mass. In an article in the *Canadian Entomologist* (1877), I gave an account of a large colony of *Callimorpha* larvæ, a species by no means common generally, and of my failure to bring one larva in two hundred to the pupa state. They were all taken at maturity, like the French silk-worms, with a purging of whitish serum. The weeds on which they fed in the woods were also covered with their dried skins. The next year they were as rare as ever. In the spring of 1874, the shade trees of our town, Newport, Ky., were attacked by legions of small gray caterpillars, spinning up and destroying the foliage, and invading doorways in such multitudes that the house broom was in constant requisition. Fine shade trees were hewn

down, or fearfully lopped of their branches to abate the nuisance. They attacked the silver poplar in preference to all others, a tree singularly free from caterpillars heretofore. I found a small tree in my yard badly infested, and promised two small boys one cent a nest for all they got down with not less than twenty-five in a brood, and burning them as they were brought me, paid them ninety-seven cents for their hour's work. What was to be expected the next year but the total ruin of every shade tree; but my payment to the same boys was but forty cents, and the next year not one was to be found, and they have never returned to vex us. Continuous wet and cloudy weather may be sufficient to infect with fungus the food these caterpillars eat, but wherever we turn our eyes we find the provisions of nature ample to repress surplus life on this globe, and in no case more so than in our own species, where the half that survive infancy are winnowed out by sword, pestilence and famine, till but a corporal's guard can be rallied at our allotted term of three score years and ten. The cases I have described are by internal poisoning; I will add one where the poison fungus acted externally. My first attempt to carry through the winter that hybernating larva, the black bear (*Expanttherca*), proved a total failure, as I put them away in the cellar where they were attacked and covered with mold, and though I washed and brushed them apparently clean, dried them in the sun and kept them out of doors the rest of the winter, they all died in the spring, refusing all food. Put away the next winter in leaves and brush, in the open air, I lost but one in ten. Exposed all winter to snow, frost and rain, under chips and wet leaves, coming out in the spring to feed, distended with moisture, they are perfectly healthy, for no fungus spores have been able to fasten upon them. That prolific oak larva, *Anisota senatoria*, is also a badly infected species, which makes it rather lucky for oak trees, for but few of them ever come to maturity. Experiments with diluted yeast should be tried on the potato bug, tobacco, army and cotton worm, and on the grasshoppers of old pastures and clover fields. The proper policy is not to kill, but simply to infect them that they may disseminate the poison. But while we fill the air with fungus spores let us have a care to discriminate between the just and the unjust; in slaughtering the Colorado bug and grasshopper, let us not also lay violent hands on our honey bee, on our harmless and beautiful butterflies, and on the various insects that sport in the sun and enliven the face of nature. The bugs and the worms that annoy us can easily be kept in check as I have shown, by paid handpickers.